Taxonomic Status of *Acleisanthes, Selinocarpus,* and *Ammocodon* (Nyctaginaceae)

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ABSTRACT. Recent molecular and morphological studies suggest that neither *Acleisanthes* nor *Selinocarpus* (Nyctaginaceae) are monophyletic as currently circumscribed. Further, these data provide no basis for continued recognition of the monotypic genus *Ammocodon* as separate from these other two genera. Therefore, all 8 *Selinocarpus* species and the monospecific *Ammocodon* are transferred to *Acleisanthes*; 3 additional *Selinocarpus* species are reduced to synonymy. The genus *Acleisanthes* is now composed of 16 species, distributed primarily in the Chihuahuan Desert of North America. Diagnostic features of *Acleisanthes* include an herbaceous or woody perennial habit in arid environments, and the presence of both cleistogamous and chasmogamous flowers often simultaneously on an individual plant. Further, flowers are usually axillary and subtended by 1 to 4 subulate bracts, with chasmogamous flowers frequently white or yellow and funnelform to salverform.

Key words: *Acleisanthes, Ammocodon,* Chihuahuan Desert, Four o'clock, Nyctaginaceae, *Selinocarpus.*

The genus *Acleisanthes* A. Gray (Nyctaginaceae) consists of 7 species distributed from southern California east to the Texas coast and south to San Luis Potosí, Mexico, with its center of distribution in the Chihuahuan Desert (Smith, 1976). *Selinocarpus* A. Gray is another small genus of 11 species found in the southwestern United States and northern Mexico, with 1 species disjunct and endemic to Somalia (Fowler & Turner, 1977; Thulin, 1993; Turner, 1993). Like *Acleisanthes, Selinocarpus* is most species-rich in the Chihuahuan Desert of New Mexico, Texas, and Mexico. Within this region, many *Selinocarpus* species appear to prefer gypseous substrates (Fowler & Turner, 1977), whereas *Acleisanthes* inhabit a variety of soils, including those that are gypseous (Smith, 1976; Levin, pers. obs.). Although the genera are morphologically similar, *Selinocarpus* species have been characterized by the presence of winged fruits similar to those found in its namesake genus *Selinum* in Apiaceae (Gray, 1853). Further, the majority of *Selinocarpus* species are perennial shrubs, whereas *Acleisanthes* species are all herbaceous perennials. However, the genera are similar in other aspects, including the production of cleistogamous flowers in addition to the often funnelform, hawkmoth-pollinated, chasmogamous flowers with nocturnal anthesis. Since the original descriptions of these genera by Gray (1853), Standley (1916) segregated *Selinocarpus chenopodioides* A. Gray into the monotypic genus *Ammocodon* Standley as *A. chenopodioides* (A. Gray) Standley based on characters now understood to be autapomorphic, including a reduction in stamen number and its many-flowered inflorescences versus the usually solitary flowers found in other species of *Selinocarpus.*

Recent phylogenetic analyses (Levin, 2000) of these genera based on molecular sequence data including the nuclear ribosomal ITS region and a region of the chloroplast genome between the *rbc*L and *acc*D genes and confirmed by morphology suggest that their current taxonomic circumscriptions need to be reevaluated. For example, there is strong support for a sister taxon relationship between *A. wrightii* (A. Gray) Bentham & Hooker and *S. diffusus* A. Gray; in a combined parsimony analysis of nuclear and chloroplast data, this relationship was retrieved in 87% of bootstrap replicates (BS) (Levin, 2000: fig. 2). Morphologically this result is not surprising, as these species are very similar vegetatively. Leaf shape and color are nearly congruent, and *S. diffusus* shares an herbaceous habit with *Acleisanthes* species, in contrast to the woody, shrub habit commonly observed in the genus *Selinocarpus.* Further, phylogenetic results clearly split *Acleisanthes* into two groups. One group is composed of three *Acleisanthes* species: *A. anisophylla* A. Gray, *A. longiflora* A. Gray, and *A. obtusa* (Choisy) Standley (BS = 87, Levin, 2000: fig. 2). In addition to strong support for this clade from molec-

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ular data, a synapomorphy for this group of *Acleisanthes* is the presence of 5 stamens in cleistogamous flowers, in contrast to the 2 stamens found in the cleistogamous flowers of the four other *Acleisanthes* and many *Selinocarpus* species. Interestingly, plants of this lineage of three *Acleisanthes* species also have fruits lacking resinous glands. By contrast, all but the basal member of the other *Acleisanthes* group possess resinous glands on their fruits. The second group of *Acleisanthes* species includes the basal *A. crassifolia* A. Gray, *A. nana* I. M. Johnston, *A. acutifolia* Standley, *A. wrightii*, and *S. diffusus*. These taxa are more closely related to all other *Selinocarpus* species and *Ammocodon chenopodioides* than to the other three *Acleisanthes* species (BS = 100, Levin, 2000: fig. 2), which are sister to the second group of *Acleisanthes* plus *Selinocarpus* species and *Ammocodon chenopodioides*. Thus, there is robust evidence that *Selinocarpus* species and *Ammocodon chenopodioides* are nested within a paraphyletic *Acleisanthes*. Consequently, I suggest that a single taxon composed of *Acleisanthes* and *Selinocarpus* species and *Ammocodon chenopodioides* be recognized.

Asa Gray (1853) first described both *Acleisanthes* and *Selinocarpus* at the same time; thus, neither name has clear priority. Therefore, I propose that eight *Selinocarpus* species, including *S. angustifolius* Torrey, *S. diffusus*, *S. lanceolatus* Wooton, *S. palmeri* Hemsley, *S. parvifolius* Torrey, *S. purpusianus* Heimerl, *S. somalensis* Chiovenda, and *S. undulatus* B. A. Fowler & B. L. Turner, and *Ammocodon chenopodioides* be transferred into *Acleisanthes*. Based on morphological evidence (see below), an additional three *Selinocarpus* species, *S. nevadensis* (Standley) B. A. Fowler & B. L. Turner, *S. maloneanus* B. L. Turner, and *S. megaphyllus* B. L. Turner, are synonymized. With the proposed combinations and synonymy, *Acleisanthes* would now be composed of 16 species, all characterized by a perennial habit and the presence of both cleistogamous and chasmogamous flowers that are often present simultaneously. All species produce funnelform to salverform chasmogamous flowers that are frequently white or yellow, less often pink or purple, and each flower is subtended by 1 to 4 subulate bracts. Flowers are generally solitary and axillary, most are hawkmoth-pollinated and fragrant, and their single-seeded fruits are either ribbed or winged. Many of these species can be locally common, but are rare at the landscape level and tend to be limited to certain substrates. The following key to *Acleisanthes* is based upon my study of both fresh and herbarium material and relevant literature (Smith, 1976; Fowler & Turner, 1977; Thulin, 1993). The fruit characters included in the key to *Acleisanthes* are not difficult to observe, because plants are rarely found without fruits from either chasmogamous or cleistogamous flowers in various stages of maturity.

KEY TO THE SPECIES OF *ACLEISANTHES* (encompassing the former taxa *Selinocarpus* and *Ammocodon*)

- 1a. Plants herbaceous perennials.
  - 2a. Fruits winged, not ribbed.
    - 3a. Flowers in cymose inflorescences of few to numerous (10 or more) flowers; chasmogamous perianth magenta-purple, 4–5 mm long; stamens in chasmogamous flowers usually 2 (rarely 3) . . . . *A. chenopodioides* (A. Gray) R. A. Levin
    - 3b. Flowers solitary to paired; chasmogamous perianth white, 20–50 mm long; stamens in chasmogamous flowers usually 5 (rarely 4).
      - 4a. Chasmogamous perianth 30–50 mm long; plants found on various substrates in the southwestern United States . . . . . . *A. diffusus* (A. Gray) R. A. Levin
      - 4b. Chasmogamous perianth 20–35 mm long; plants found in Somalia . . . . *A. somalensis* (Chiovenda) R. A. Levin
  - 2b. Fruits ribbed, not winged.
    - 5a. Fruits with resinous glands at or near proximal end.
      - 6a. Plants with stems 2–8 cm long; chasmogamous perianth purple, 8–10 mm long . . . . *A. nana* I. M. Johnston
      - 6b. Plants with stems 10–40 cm long; chasmogamous perianth white, 25–45 mm long.
        - 7a. Plants upright; resinous glands occurring below proximal end of fruit; plants found from 750 to 2500 m in elevation . . . . *A. acutifolia* Standley
        - 7b. Plants more prostrate; resinous glands occurring at proximal end of fruit; plants found from 250 to 1000 m in elevation . . . . *A. wrightii* (A. Gray) Bentham & Hooker
    - 5b. Fruits without resinous glands.
      - 8a. Veins of upper leaf surfaces with white, conspicuous trichomes; cleistogamous flowers with 2 stamens . . . . *A. crassifolia* A. Gray
      - 8b. Veins of upper leaf surfaces glabrous; cleistogamous flowers with 5 stamens.

9a. Plants prostrate, stems to 15 cm long; leaf pairs at a node strongly unequal; veins deeply incising upper leaf surface; fruits with 10 ribs . . . *A. anisophylla* A. Gray

9b. Plants prostrate to clambering, stems to 100 cm long; leaf pairs equal to subequal; veins of upper leaf surface inconspicuous; fruits with 5 ribs.

10a. Flowers solitary; chasmogamous perianth to 17 cm long . . . . *A. longiflora* A. Gray

10b. Flowers solitary or in cymes of 2–5 flowers; chasmogamous perianth 2.5–5 cm long . . . . . *A. obtusa* (Choisy) Standley

1b. Plants woody perennial shrubs.

11a. Plants with divaricating branching, having profusely branched stems; chasmogamous perianth usually yellow, 30–50 mm long.

12a. Shrubs small, to 3 dm tall; leaves to 40 mm long; chasmogamous perianth yellow to white . . . . *A. lanceolatus* (Wooton) R. A. Levin

12b. Shrubs larger, to 6 dm tall; leaves to 20 mm long; chasmogamous perianth usually yellow, rarely white or pink.

13a. Stems grayish purple; leaves linear to lanceolate; chasmogamous perianth yellow, white, or pink; plants occurring on gypsum.

14a. Chasmogamous perianth pink; mature fruits 5–7 mm long . . . . *A. palmeri* (Hemsley) R. A. Levin

14b. Chasmogamous perianth yellow or white; mature fruits 7.5–10 mm long . . *A. purpusianus* (Heimerl) R. A. Levin

13b. Stems not gray; leaves ovate; chasmogamous perianth yellow; plants found on sandstone and limestone in addition to gypseous soil . . . . *A. parvifolius* (Torrey) R. A. Levin

11b. Plants virgate, stems having few branches; chasmogamous perianth green-yellow to red-orange, 6–12 mm long.

15a. Leaf margins sinuous; chasmogamous perianth ochreous . . . . *A. undulatus* (B. A. Fowler & B. L. Turner) R. A. Levin

15b. Leaf margins straight; chasmogamous perianth green-yellow . . . . . *A. angustifolius* (Torrey) R. A. Levin

Acleisanthes angustifolius (Torrey) R. A. Levin, comb. nov. Basionym: *Selinocarpus angustifolius* Torrey, Rep. U. S. Mex. Bound. Surv., Bot., 170. 1859. TYPE: Mexico. Chihuahua: Presidio del Norte (Ojinaga), July 1852, *C. C. Parry et al. s.n.* (lectotype, designated by Fowler & Turner (1977), NY not seen; isolectotype, US).

This species, together with *A. undulatus*, is distinctive among *Acleisanthes* due to the presence of short, relatively inconspicuous chasmogamous flowers. It is distinguished from its sister taxon, *A. undulatus*, in having flowers that are green-yellow rather than orange, straight leaf margins, greater edaphic tolerance, and occurring over a wider geographical range. I have observed this species growing in sympatry with *A. undulatus*, and in such areas both species are readily discerned.

Specimens examined. U.S.A. **Texas:** Brewster Co., Tornillo Creek in Big Bend National Park, *Levin 97–1* (ARIZ); ca. 75 mi. S of Alpine, *Powell 2180* (NMC); Presidio Co., 2 mi. N of Presidio, *Spellenberg & Moore 2623* (NMC). MEXICO. **Chihuahua:** base of N end of Sierra del Cuchillo Parado where crossed by Ojinaga–Cd. Chihuahua Hwy., 60 km W of Ojinaga, *Chiang, Wendt & Johnston 9772* (NMC). **Coahuila:** ca. 6.9 mi. SW of Cuatro Ciénegas on Hwy. to San Pedro, then 0.7 mi. E of Hwy. in first canyon on N side of limestone Sierra San Marcos del Pino, *Henrickson 20402* (ARIZ). **Durango:** ca. 0.5 mi. SW of Lerdo on first limestone road cut, *Spellenberg & Syvertsen 3763* (NMC).

Acleisanthes chenopodioides (A. Gray) R. A. Levin, comb. nov. Basionym: *Selinocarpus chenopodioides* A. Gray, Amer. J. Sci. Arts, ser. 2, 15: 262. 1853. *Ammocodon chenopodioides* (A. Gray) Standley, J. Wash. Acad. Sci. 6: 629. 1916. TYPE: U.S.A. Texas or New Mexico, 1851 or 1852, *C. Wright 1707*, left side of sheet (lectotype, designated by Fowler & Turner (1977), "left hand specimen on sheet," GH).

This taxon was one of the original species that defined the genus *Selinocarpus* by Gray (1853), having the characteristic winged fruits. Later this species was segregated into its own genus, *Ammocodon*, based upon flowers that were unique among *Selinocarpus*; flowers occur in many-flowered, cymose inflorescences, whereas solitary, axillary flowers are usual within the genus (Standley, 1916). Further, chasmogamous flowers are small and have a reduced number of stamens. However, other characters unite this species with *Acleisanthes* as here circumscribed. Plants are herbaceous, a habit shared with *Acleisanthes* s. str. as well as *A. diffusus* and *A. somalensis*. Molecular data suggest that this taxon clearly belongs nested within a broadly defined *Acleisanthes*, and that it may be sister to *A. somalensis* (Levin, 2000).

Specimens examined. U.S.A. **Arizona:** Cochise Co., Portal–Rodeo Rd., 4 mi. NW of Rodeo, near cattle guard, *McCormick & Assoc. 215* (ARIZ). **New Mexico:** Doña Ana Co., The Jornada LTER, G-BASN NPP site, NE corner, Lower Summerford Mtn. Bajada slope, *Levin 99–1* (ARIZ). **Texas:** Hudspeth Co., N end of the Quitman Mtns. at a roadside park along I-10, *Worthington 6694* (ARIZ).

Acleisanthes diffusus (A. Gray) R. A. Levin, comb. nov. Basionym: *Selinocarpus diffusus* A. Gray, Amer. J. Sci. Arts, ser. 2, 15: 262. 1853. TYPE: U.S.A. Texas: Pecos Co., 1851 or 1852, *C. Wright 1708* (lectotype, designated by Fowler & Turner (1977), GH).

Selinocarpus nevadensis (Standley) B. A. Fowler & B. L. Turner, Phytologia 37: 201. 1977. Syn. nov. *Selinocarpus diffusus* A. Gray subsp. *nevadensis* Standley, Contr. U.S. Natl. Herb. 12: 388. 1909. TYPE: U.S.A. Nevada: Lincoln Co., Overton, May 1891, *V. Bailey 1932* (holotype, US).

Fowler and Turner (1977) defined *S. nevadensis* as distinct from *S. diffusus* on the basis of having wider, rounder leaves and a more narrow, delicate chasmogamous perianth. However, these differences are likely due to environmental effects on plastic morphological traits. Therefore, I do not believe there is sufficient evidence that these species are separate, and I am reducing *S. nevadensis* to synonymy with *A. diffusus*.

Specimens examined. U.S.A. **Arizona:** Mohave Co., along US Hwy. 93 ca. 30 mi. NW of Chloride, *Barr 68–283* (ARIZ). **Nevada:** Clark Co., ca. 2 mi. N of Jean, off frontage road by I-15, *Levin 98–1* (ARIZ); Mt. Springs Summit, 2.1 mi. below Blue Diamond cutoff, *Niles & Plum 972* (ARIZ); Mojave Desert, ca. 30 mi. N of Las Vegas, 19 mi. S of Indian Springs, E side of US Hwy. 95, *Spellenberg 9482* (NMC). **New Mexico:** De Baca Co., 48 air km S of Fort Sumner, E side Pecos River, summit of Espia Peak, *Spellenberg & Zucker 12404* (NMC). **Oklahoma:** Harmon Co., on gypsum 6 mi. S of Hollis, *Waterfall 9001* (ARIZ).

Acleisanthes lanceolatus (Wooton) R. A. Levin, comb. nov. Basionym: *Selinocarpus lanceolatus* Wooton, Bull. Torrey Bot. Club 25: 304. 1898. TYPE: U.S.A. New Mexico: Doña Ana Co., just S of the White Sands, 26 Aug. 1897, *E. O. Wooton 389* (holotype, US; isotypes, NMC, US).

Selinocarpus maloneanus B. L. Turner, Phytologia 75: 239. 1993 [1994]. Syn. nov. TYPE: U.S.A. Texas: Hudspeth Co., N end of Malone Mtns., near Finley, 29 July 1958, *D. S. Correll & I. M. Johnston 20358* (holotype, LL not seen).

Selinocarpus megaphyllus (B. A. Fowler & B. L. Turner) B. L. Turner, Phytologia 75: 242. 1993 [1994]. Syn. nov. *Selinocarpus lanceolatus* Wooton var. *megaphyllus* B. A. Fowler & B. L. Turner, Phytologia 37: 181. 1977. TYPE: Mexico. Chihuahua: ca. 15 mi. SW of Estación Moreón on Río Conchos Lake Road, Sierra de las Monillas, 25 May 1971, *A. M. Powell 2105* (holotype, LL not seen).

The main distinctions between *S. maloneanus*, *S. megaphyllus*, and *A. lanceolatus* are in leaf shape and width, and *S. megaphyllus* is reportedly distinguished from the other two species by a larger, white chasmogamous perianth (Fowler & Turner, 1977; Turner, 1993). However, Fowler and Turner (1977) noted that there is morphological overlap between *S. megaphyllus* and *A. lanceolatus*, and the vegetative characters that have been used to separate these three species are known to be quite plastic. An excellent example of the wide variation in leaf shape within a population is the NMC collection of *Spellenberg & Syvertsen 3758*, listed below, that includes specimens from multiple individuals at the same locality. These individuals were clearly conspecific, with gradations in leaf width as the only distinction among the individuals. I have examined a specimen (*Spellenberg & Syvertsen 3753*) from the same locality as one (*Powell 2116*; Turner, 1993: 241) considered conspecific with *S. maloneanus* and a specimen (*Henrickson 6799*) collected from the type locality (Turner, 1993: 242) of *S. megaphyllus*. In addition to these, I have examined other specimens of *A. lanceolatus*, and I do not believe that the distinctions outlined by Turner (1993) warrant specific recognition.

Specimens examined. U.S.A. **New Mexico:** Otero Co., about 14 mi. W of Alamogordo on US Hwy., at Point of Sands just W of White Sands National Monument, *Spellenberg 3910* (NMC). **Texas:** Culberson Co., 36 mi. N of Van Horn on Hwy. 54, *Levin 97–5* (ARIZ); State Hwy. 54 N of Van Horn, 15 mi. S of junction with US Hwy. 62–180 in NW corner of county, *Spellenberg & Ward 9711* (NMC). MEXICO. **Chihuahua:** 12 mi. NE of Cuchillo Parado along old road in a gypsum outcropping N of Río Conchos, *Henrickson 6799* (NMC); 13.6 km W of Camargo on road to Lago Boquilla, on gypsum river terraces, *Spellenberg & Syvertsen 3758* (NMC); 17.4 mi. SW of Coyame, 8.8 mi. NE of railroad crossing, Chihuahua Hwy. 16, *Spellenberg & Syvertsen 3753* (NMC).

Acleisanthes palmeri (Hemsley) R. A. Levin, comb. nov. Basionym: *Selinocarpus palmeri* Hemsley, Biol. Cent.-Amer., Bot., 3: 6. 1882. TYPE: Mexico. Coahuila: San Lorenzo de Laguna, May 1880, *E. Palmer 1118* (holotype, K not seen; isotype, US).

The characters that appear to distinguish this species from *A. purpusianus* are a smaller fruit and the presence of a pink chasmogamous perianth, rather than the yellow or white perianth found in *A. purpusianus*. In addition to these morphological differences, *A. palmeri* is known only from two proximate localities in Coahuila, Mexico. Therefore, it may be more appropriate to synonymize *A. palmeri* with *A. purpusianus*, a similar species also limited to a few gypseous localities in Coahuila, although nomenclatural priority would be given to *A. palmeri*. However, as I have not observed *A. palmeri* in the field and have only viewed two herbarium specimens of this species, it does not seem appropriate at the present time to reduce these two species to synonymy.

Specimens examined. MEXICO. **Coahuila:** ca. 15 road mi. E of Torreón and about 2.6 mi. by winding road E of El Coyote, at the NW end of a small mtn. range, the Sierra de Solis, mostly on the tops of knolls, *Spellenberg & Syvertsen 3768* (NMC).

Acleisanthes parvifolius (Torrey) R. A. Levin, comb. nov. Basionym: *Selinocarpus diffusus* A. Gray var. *parvifolius* Torrey, Rep. U. S. Mex. Bound. Surv., Bot., 168. 1859. *Selinocarpus parvifolius* (Torrey) Standley, Contr. U.S. Natl. Herb. 12: 388. 1909. TYPE: U.S.A. Texas: Cañons of the Rio Grande or Presidio del Norte, 1852, *C. C. Parry et al. s.n.* (lectotype, designated by Fowler & Turner (1977), GH; isolectotype, US).

This species is similar morphologically to *A. lanceolatus*, *A. purpusianus*, and *A. palmeri*. Most notably, these four taxa share a distinctive divaricating branching pattern within a woody shrub, and they also have very similar flowers. However, whereas these other species appear confined to gypseous soils, *A. parvifolius* is not so restricted.

Specimens examined. U.S.A. **Texas:** Brewster Co., Tornillo Creek, Big Bend National Park, *Levin 97–2* (ARIZ); Hudspeth Co., 33 mi. SE from freeway on Texas Rd. 192, on county portion of road, between Quitman Mts. & the Rio Grande, *Spellenberg & Ward 9688* (NMC). MEXICO. **Chihuahua:** 10.7 road mi. S of Ojinaga along Hwy. 18 (Ojinaga–C. Camargo), open sandstone hill along Hwy., *Hendrickson 7704* (NMC).

Acleisanthes purpusianus (Heimerl) R. A. Levin, comb. nov. Basionym: *Selinocarpus purpusianus* Heimerl, Oesterr. Bot. Z. 63: 353. 1913. TYPE: Mexico. Coahuila: Sierra del Rey, June 1910, *C. A. Purpus 4505* (holotype, US).

As discussed in the entry for *A. palmeri*, these two taxa are very similar except for a difference in perianth color. This may likely be due to population-level differences, especially as there is known variation among populations of *A. purpusianus*, some of which have a yellow chasmogamous perianth, others a cream to white perianth (Fowler & Turner, 1977).

Specimens examined. MEXICO. **Coahuila:** Km 134 on Hwy. 30 towards Torreón, *Levin 98–6* (ARIZ); Hwy. 30, 68 mi. N of San Pedro, on gypseous flat, about 7 mi. S of Puente Arroyo Seco, *Spellenberg, Willson & Feather 4050* (NMC); ca. 12 (air) mi. SW of Cuatro Ciénegas (13.5 road mi.) along Hwy. to San Pedro and 4.4 mi. W on trail, *Henrickson 12552* (NMC); Hwy. 57, 1.2 mi. S of Hermanas, *Spellenberg & Syvertsen 3779* (NMC).

Acleisanthes somalensis (Chiovenda) R. A. Levin, comb. nov. Basionym: *Selinocarpus somalensis* Chiovenda, Flora Somala 284. 1929. TYPE: Somalia. Costa dei Migiurtini, dintorni di Biaddo, June 1924, *N. Puccioni & G. Stefanini 814* (holotype, FT not seen).

Despite its disjunct occurrence in Somalia, both morphological and molecular evidence support its inclusion within the genus *Selinocarpus* (Levin, 2000) and, thus, within a newly expanded *Acleisanthes*. With the other species formerly placed in *Selinocarpus*, this taxon shares a presence of winged fruits and a preference for gypseous soils. Surprisingly, *A. somalensis* looks remarkably similar to *A. diffusus*, although molecular sequence data suggest a close relationship with *A. chenopodioides*.

Specimens examined. SOMALIA. **Buran (Sorl):** 10–13°N, 48–47°E, *Collenette 125* (K). **Galguduud:** 4 km S of Ceelbuur (El Bur) on road to Gal Hareeri, gypsum plain, *Thulin & Dahir 6517* (K).

Acleisanthes undulatus (B. A. Fowler & B. L. Turner) R. A. Levin, comb. nov. Basionym: *Selinocarpus undulatus* B. A. Fowler & B. L. Turner, Phytologia 37: 194. 1977. TYPE: Mexico. Coahuila: 4 mi. W of Cuatro Ciénegas, mouth of canyon, 24–26 Aug. 1938, *I. M. Johnston 7159* (holotype, GH).

Although this species occurs in geographically proximate locations to *A. palmeri* and *A. purpusianus*, both morphological and molecular evidence closely ally *A. undulatus* with *A. angustifolius* (Levin, 2000). These sister taxa share a short chasmogamous perianth and virgate growth form, lacking the divaricating branching pattern of *A. lanceolatus*, *A. parvifolius*, *A. purpusianus*, and *A. palmeri*. *Acleisanthes undulatus* can be distinguished from *A. angustifolius* by its sinuate leaf margins and ochreous perianth.

Specimens examined. MEXICO. **Coahuila:** outside of Cuatro Ciénegas at Km 94 on Hwy. 30 towards Torreón, *Levin 98–7* (ARIZ); 8 km W of Cuatro Ciénegas on S slopes and foothills of Sierra de la Madera, *Johnston, Chiang & Morofka 12076* (NMC); Mpio. Parras, S side of Sierra Parras along road toward Menchaca, ca. 14 air km S of Parras, just N of Sierra Prieta, *Nesom 7651* (NMC).

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